

What is claimed is:

1     1.     A wireless communication method, comprising:  
2             receiving a center modulated signal on a wireless channel  $n$ , a lower adjacent  
3     modulated signal on a lower adjacent licensed channel  $n-1$ , and a higher adjacent  
4     modulated signal on a higher adjacent licensed channel  $n+1$ ;  
5             simultaneously processing the center modulated signal into a baseband  
6     signal and characterizing the lower and higher adjacent modulated signals; and  
7             sending a control signal to a transmitter of the center modulated signal based  
8     on a characterization of the lower and higher adjacent modulated signals.

1     2.     The method of claim 1, wherein receiving a center modulated signal on a  
2     wireless channel  $n$ , a lower adjacent modulated signal on a lower adjacent licensed  
3     channel  $n-1$ , and a higher adjacent modulated signal on a higher adjacent licensed  
4     channel  $n+1$  includes filtering a representative signal of a received signal through a  
5     three channel filter to provide representative signals of the center modulated signal  
6     and the lower and higher adjacent modulated signals.

1     3.     The method of claim 1, simultaneously processing the center modulated  
2     signal into a baseband signal and characterizing the lower and higher adjacent  
3     modulated signals includes:  
4             conditioning the center modulated signal and the lower and higher adjacent  
5     modulated signals into a filtered signal; and  
6             processing the filtered signal into a processed signal using a three channel  
7     bandpass filter and frequency converter to provide the processed signal with a  
8     known first frequency to carry a representative signal for the lower adjacent  
9     modulated signal, a known second frequency to carry a representative signal for the  
10    center modulated signal, and a known third frequency to carry a representative  
11    signal for the higher adjacent modulated signal.

1 4. The method of claim 3, wherein simultaneously processing the center  
2 modulated signal into a baseband signal and characterizing the lower and higher  
3 adjacent modulated signals further includes:

4 independently filtering the processed signal using a switched filter to  
5 suppress the known lower and higher adjacent modulated signals;  
6 converting the processed signal from an analog signal into a digital signal;  
7 demodulating the digital signal to provide the baseband signal; and  
8 characterizing the lower and higher adjacent modulated signals.

1 5. The method of claim 1, wherein sending a control signal to a transmitter of  
2 the desired signal based on a characterization of the lower and higher adjacent  
3 modulated signals includes sending a control signal to the transmitter to change a  
4 transmission frequency to another available channel.

1 6. The method of claim 1, wherein sending a control signal to a transmitter of  
2 the desired signal based on a characterization of the lower and higher adjacent  
3 modulated signals includes sending a control signal to the transmitter to modify a  
4 power level for a transmission of the desired signal.

1 7. A receiver, comprising:  
2 means to receive a wireless signal having modulated frequencies  
3 corresponding to at least a wireless channel  $n$  and two adjacent licensed channels  $n-1$   
4 and  $n+1$ ;  
5 means to process the wireless signal to simultaneously provide a baseband  
6 signal corresponding to the wireless channel  $n$  and characterize signals  
7 corresponding to the two adjacent channels  $n-1$  and  $n+1$ ; and  
8 means to send a control signal to a transmitter adapted to transmit a signal  
9 over wireless channel  $n$  based on a characterization of the signals corresponding to  
10 the two adjacent channels  $n-1$  and  $n+1$ .

1 8. The receiver of claim 7, wherein the means to process the wireless signal to  
2 simultaneously provide a baseband signal corresponding to the wireless channel n  
3 and characterize signals corresponding to the two adjacent channels n-1 and n+1  
4 includes:  
5 means to filter a signal representative of the wireless signal into a signal  
6 having first, second and third frequencies corresponding to channels n-1, n and n+1;  
7 and  
8 means to demodulate a signal corresponding to the second frequency and to  
9 characterize signals corresponding to the first and third frequencies.

1 9. The receiver of claim 8, further comprising means to independently adjust  
2 signal levels on the first and third frequencies.

1 10. The receiver of claim 7, wherein the means to process the wireless signal to  
2 simultaneously provide a baseband signal corresponding to the wireless channel n  
3 and characterize signals corresponding to the two adjacent channels n-1 and n+1  
4 includes:  
5 means to up-convert a first signal representative of the wireless signal into  
6 an up-converted second signal such that a frequency corresponding to channel N is  
7 increased to a known up-converted center frequency and frequencies corresponding  
8 to the adjacent channels N-1 and N+1 are increased to up-converted adjacent  
9 frequencies;  
10 means to filter the up-converted second signal to pass the up-converted  
11 center frequency and the up-converted adjacent frequencies as a filtered up-  
12 converted third signal;  
13 means to down-convert the third signal to a down-converted fourth signal  
14 that includes a known down-converted center frequency corresponding to the  
15 channel n and known down-converted adjacent frequencies corresponding to  
16 channels n-1 and n+1;

17 means to independently filter and balance the known down-converted  
18 adjacent frequencies to reduce dynamic range; and  
19 means to demodulate the down-converted center frequency into the  
20 baseband frequency and characterize the balanced adjacent channel frequency  
21 components.

1 11. A receiver, comprising:  
2 a signal processing module to filter and frequency convert a signal  
3 representative of a radio frequency (RF) signal to provide a processed signal having  
4 predetermined first, second and third frequencies, the predetermined second known  
5 frequency corresponding to a center channel  $n$  of the RF signal, and the  
6 predetermined first and third frequencies corresponding to adjacent licensed RF  
7 channels  $n-1$  and  $n+1$ ;  
8 an adjacent carrier filter module to independently filter the predetermined  
9 first and third frequencies of the processed signal and to provide a balanced signal  
10 representative of channels  $n-1$ ,  $n$  and  $n+1$ ;  
11 an analog-to-digital converting module to convert the balanced signal from  
12 an analog signal to a digital signal; and  
13 a processor to receive the digital signal, provide a baseband signal for the RF  
14 channel  $n$  and characterize the adjacent RF channels  $n-1$  and  $n+1$ .

1 12. The receiver of claim 11, wherein the processor is adapted to provide a  
2 transmitter control signal to be transmitted to a transmitter adapted to transmit  
3 signals on channel  $n$ .

1 13. The receiver of claim 12, wherein the transmitter control signal includes a  
2 signal for the transmitter to adjust a power level for a transmission on channel  $n$ .

1 14. The receiver of claim 12, wherein the transmitter control signal includes a  
2 signal for the transmitter to transmit on another channel.

1 15. The receiver of claim 11, wherein the signal processing module includes:  
2 an up-converter to convert the processed signal into an up-converted signal  
3 with increased frequencies such that the center channel  $n$  and the adjacent channels  
4  $n-1$  and  $n+1$  in the up-converted signal have known up-converted frequencies;  
5 a bandpass filter to filter the up-converted signal and pass a filtered signal  
6 with known up-converted frequencies corresponding to the center channel  $n$  and the  
7 adjacent channels  $n-1$  and  $n+1$ ; and  
8 a down-converter to convert the filtered signal into a down-converted signal  
9 with decreased frequencies such that the center channel  $n$  and the adjacent channels  
10  $n-1$  and  $n+1$  in the down-converted signal have known down-converted frequencies.

1 16. The receiver of claim 11, further comprising a signal conditioning module  
2 including at least one bandpass filter module.

1 17. The receiver of claim 16, wherein the at least one bandpass filter module is  
2 adapted to pass frequencies within a UHF frequency range.

1 18. The receiver of claim 11, further comprising a signal conditioning module  
2 including a power calibration module to adjust an amplitude of the signal  
3 representative of a radio frequency (RF) signal based on a power level of the RF  
4 signal.

1 19. The receiver of claim 11, further comprising a signal conditioning module  
2 adapted to pass the conditioned signal with a frequencies between approximately  
3 450 MHz and approximately 700 MHz, wherein the signal processing module  
4 includes:  
5 an up-converter to synthesize the conditioned signal with a up-conversion  
6 mixing signal having a frequency within a range of approximately 200 MHz to 500  
7 MHz, the frequency of the up-conversion mixing signal being selectable in 6 MHz

8 steps based on the frequency of channel n such that channel N in a resulting up-  
9 converted signal has a center frequency of approximately 915 MHz;  
10 a surface acoustic wave (SAW) filter to filter the up-converted signal and  
11 pass frequencies within a range of approximately 906 MHz to 924 MHz as a filtered  
12 up-converted signal, wherein channel n is represented at a center frequency of  
13 approximately 915 MHz in the filtered up-converted signal, channel n-1 is  
14 represented at a center frequency of approximately 909 MHz in the filtered up-  
15 converted signal; and channel n+1 is represented at a center frequency of  
16 approximately 921 MHz in the filtered up-converted signal; and  
17 a down-converter to mix the filtered up-converted signal with a down-  
18 conversion mixing signal have a frequency of approximately 900 MHz to provide a  
19 down-converted signal within a range of approximately 6 MHz to 24 MHz, wherein  
20 channel n is represented at a center frequency of approximately 15 MHz in the  
21 down-converted signal, channel n-1 is represented at a center frequency of  
22 approximately 9 MHz in the down-converted signal, and channel n+1 is represented  
23 at a center frequency of approximately 21 MHz in the down-converted signal.

1 20. The receiver of claim 19, wherein:  
2 the down-converter includes an image reject mixer to provide an in-phase  
3 signal (I) and a quadrature-phase signal (Q); and  
4 the adjacent carrier filter module to independently filter and suppress the  
5 9MHz and 21 MHz channels for both the I and Q signal.

1 21. The receiver of claim 20, wherein the analog-to-digital (A-D) converting  
2 module includes a first 12-bit A-D converter to convert the I signal from an analog  
3 signal to a digital signal, and a second 12-bit A-D converter to convert the Q signal  
4 from an analog signal to a digital signal.

1 22. A wireless communication system, comprising:  
2 a substantially omni-directional antenna; and

3           a receiver connected to the antenna to receive a desired signal over a radio  
4 frequency (RF) channel  $n$  and signals over adjacent licensed RF channels  $n-1$  and  
5  $n+1$ , to process the desired signal and signals over adjacent wireless channels to  
6 provide a demodulated signal corresponding to the RF channel  $n$  and a  
7 characterization of the signals over the RF adjacent channels  $n-1$  and  $n+1$  in real  
8 time, and to send a control signal to a transmitter of the desired signal, the control  
9 signal being based on the characterization of the signals over the RF adjacent  
10 channels  $n-1$  and  $n+1$ .

1   23.    The system of claim 22, wherein the RF channels  $n-1$ ,  $n$ , and  $n+1$  are within  
2 a UHF frequency range.

1   24.    The system of claim 22, wherein the control signal includes a signal for the  
2 transmitter to adjust a power level for transmission of the desired signal over the RF  
3 channel  $n$ .

1   25.    The system of claim 22, wherein the control signal includes a signal for the  
2 transmitter to change a frequency for transmission of the desired signal.

1   26.    The system of claim 22, wherein the receiver includes:  
2           a signal processing module to filter and frequency convert a signal  
3 representative of an RF signal to provide a processed signal having known first,  
4 second and third frequencies, the second known frequency of the processed signal  
5 corresponding to the RF channel  $n$ , and the first and third known frequencies of the  
6 processed signal corresponding to the RF adjacent channels  $n-1$  and  $n+1$ ; and  
7           an adjacent carrier filter module to independently filter the first and third  
8 known frequencies of the processed signal and to provide a suppressed signal  
9 representative of the RF channels  $n-1$ ,  $n$  and  $n+1$ .